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NOTES ON SOME CICADAS FROM THE EASTERN AND CENTRAL UNITED STATES WITH A DE- SCRIPTION OF A NEW VARIETY OF CICADA PRUINOSA.¹

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Under the name *Rihana grossa* Fabricius, W. L. Distant in his Synonymic Catalogue of Homoptera, Part 1, Cicadidæ, London, 1906, includes as synonyms *Cicada marginata* Say (1825), *Cicada auletes* Germar (1834), *Cicada resh* Haldeman (1852), *Cicada sonora* Walker (1850), *Cicada resonans* Walker (1850), *Fidicina literata* Walker (1850), *Cicada marginalis* Walker (1852) and *Fidicina figurata* Walker (1858). In using the specific name *grossa* for the largest cicada in the eastern United States Distant follows the synonymy suggested by Prof. Uhler in 1905.

It appears to the present author, however, after going over a considerable number of specimens accumulated during the past few years, that several of the names considered as synonyms really refer to very distinct species and he has here tried to clear up the matter to some extent. Mr. E. P. Van Duzee thinks that the generic name *Tibicen* should be used for the species here mentioned; they are placed under *Rihana* by Distant, as stated above. However, as they were

¹ The photographs of the species mentioned were made by Mr. Howard H. Cleaves, of the Staten Island Association of Arts and Sciences.

nearly all first described under *Cicada*, we have here used that name, as any change is unnecessary for the object of this paper.

***Cicada auletes* Germar.**

Cicada grossa Fabricius?

For a good life-sized figure of this species see Howard's "Insect Book," Plate XXVIII, fig. 19, where it bears the name of *C. marginata* Say. Smith and Grossbeck figure the genitalia of this species also under the name of *C. marginata* in their "Studies in Certain Cicada Species," Entomological News, April, 1907.

In Entomological News for March, 1905, Prof. Uhler has this to say of *Cicada grossa*: "This species has recently been brought to light in the British Museum, where, through the courtesy of Dr. G. R. Waterhouse, I was permitted to examine the types of Fabricius in the collection of Sir Joseph Banks. They proved to be two specimens of the large form of which I have specimens from North Carolina, Arkansas, Texas, Kansas, New York City, Northern New Jersey, Maryland and Virginia. . . . Variations in size, color and pattern of markings are, perhaps, responsible for the exaggerated synonymy which has accumulated upon this species."

Among the synonyms of *C. grossa* he places *Cicada marginata* Say (1825), *Cicada auletes* Germar (1834), and a number of species described by Walker in 1850.

The original description of *C. grossa* by Fabricius in 1775 is very general and would do for many of the large cicadas. He says, however, that the tarsi are black. In our insect they are olive green. He also gives the habitat as Brazil, but as Uhler says, this may be an error.

The next name on the list is *Cicada auletes* Germar, and there is no doubt about this being our species. He says the insect lives in Pennsylvania and he refers to the figure of the "great Indian Cicada" in the work of August Johann Rösel, "De Natuurlyke Historie der Insecten," Tab. XXV, fig. 5, where is shown a species a little over three inches in length. This of course is not our American insect but ours in size approaches it. Germar describes the pruinose condition of the insect, also its black and olive coloring, including the legs which he says are olivaceous. Of the operculum he says that it is "large, reaching middle of abdomen, oblong, with the sides sub-sinuate, apex obtusely rounded, olivaceous."

Our largest cicada can then be called *C. auletes* Germar with certainty, though possibly it should be called *C. grossa*, but Dr. Uhler's tendency in this group, to associate two or more species under one name is well known, and he may have been mistaken in this instance. At any rate it is narrowed down to one or the other of these names and *C. marginata* and *C. resh* should not be considered in the case as I hope to show.

Cicada auletes has a rather wide distribution and in the following records those marked with an asterisk are represented by specimens in the author's collection.

Brant Rock, Plymouth Co., Mass. (C. A. Frost). Collection Boston Society of Natural History.

Martha's Vineyard, Mass. Boston Society of Natural History, and Museum of Comparative Zoology, Cambridge, Mass.

New Haven, Conn. Collection Conn. Agri. Exp. Station.

Long Island, N. Y.,* July, Aug., Sept., Oct.

Staten Island, N. Y.,* July, Aug., Sept.

Manhattan Island, N. Y. City,* Sept. 8, 1910.

New Jersey,* Aug., Sept., Oct., particularly abundant in the sandy areas in the central and southern parts of the state.

District of Columbia, collection Am. Museum of Natural History.

Baltimore, Maryland.

Fairfax Co., Va.,* Aug. (C. R. Shoemaker).

Nelson Co., Va.,* July, Aug. (Col. Wirt Robinson).

Raleigh, N. C.,* July, Aug., Sept. (C. S. Brimley).

Lake Toxaway, N. C. (Mrs. Slosson).

Southern Pines, N. C., Aug. (A. H. Manee).

Clemson College, S. C., Aug. (M. P. Somes).

Atlanta, Ga., July, Aug. (J. C. Bradley).

Bainbridge, Ga., Sept. (J. C. Bradley).

Mobile, Alabama,* Aug., Sept. (H. P. Loding).

Baton Rouge, La. (H. A. Morgan).

Mississippi.

Mountain Grove, Mo., Aug. (M. P. Somes).

Chetopa, Kans.,* July 24, 1914 (D. R. Beardslee).

Allegan, Mich., Aug. 19, 1913 (collected by F. Psota and in the collection of W. J. Gerhard). This is a male and looks just like specimens from New Jersey.

The author has forty specimens of this species in his collection and has seen many more, and they show hardly any variation. In fresh specimens the dorsal part of the abdomen at base and the three last segments are often pruinose, leaving four intermediate segments dark in color. The following measurements are taken from a male from New Jersey and a female from Staten Island, N. Y.

	Male, Mm.	Female, Mm.
Length of body	41	40
Length of fore wing	53	52
Expanse of wings	117	115

***Cicada marginata* Say.**

This species was described from Missouri by Thomas Say in 1825 and was called *marginata* for the reason that the abdominal segments are yellowish on their posterior margins. The length of the insect is as he says "more than two inches and a quarter to the tip of the hemelytra," but it is not much more. The W-mark on the fore wings is absent or nearly so in this species, and the costal margin is somewhat bent near its central portion instead of being evenly rounded as in *Cicada resh*. It is also smaller and of a lighter green color than the olivaceous *auletes*. Uhler in his Preliminary Survey of the Cicadidæ of the United States, Antilles and Mexico, Trans. Maryl. Acad. Sci., 1892, says that the "W-shaped mark near the tip of the wing-covers" is sometimes absent in *Cicada tibicen* and that this is also the case "most commonly of all, with *C. auletes* Germ. (*marginata* Say)." He had probably been examining true *marginata* when he wrote this. The male genitalia are very different from *auletes*. The supra-anal plate is narrower and is without the three dorsal terminal points present in that species. Further the uncus when viewed in profile is narrowed to the rounded tip and not widened as in *auletes*. When viewed from behind, that is at full face, the uncus ends in a rounded point, whereas in *auletes* the end is notched.

As was stated in connection with the remarks on *C. auletes* and *C. grossa* the figure in Entomological News, Vol. XVIII, Pl. 3 is that of the genitalia of *Cicada auletes* and not of *Cicada marginata* as there stated.

The following specimens are in the author's collection:

Cincinnati, Ohio, Aug. 7, 1911, female (Chas. Dury).

Kentucky, Aug. 28, 1902, male (Chas. Dury).

Wakefield, Clay Co., Kansas, male and female (J. C. Warren).

Chetopa, Labette Co., Kansas, July, 1 male, 3 females; Aug., 6 males, 4 females (D. R. Beardslee).

In the collection of the Museum of Comparative Zoology there are two females from Texas and a male marked "Florida (Miss Willard)."

Walker in his List of Homoptera, Vol. IV, p. 1128, 1852, changes Say's *marginata* to *Cicada marginalis* "to distinguish it from *C. marginata* Olivier." This last is now *Ariasa marginata* Oliv. according to Distant. It is a Brazilian species.

Cicada resh Haldeman.

This species was described from the Great Salt Lake Valley by Prof. S. S. Haldeman in the appendix to the report on the Exploration and Survey of the Valley of the Great Salt Lake of Utah, Washington, 1853.

In the author's collection there are seventy-six specimens identified as this species. They are from Louisiana, Texas and Oklahoma and are like in markings the specimen figured by Haldeman on Plate IX of the report referred to. In fresh specimens the pronotum is green with the "narrow Y-shaped line divided to the base, a narrow transverse lateral spot on each side posteriorly and another anteriorly, immediately behind the lateral stemmata. Mesonotum black, with a large lateral elongated yellow spot [green in fresh specimens], and a pair of similarly colored medial spots in the shape of the Hebrew letter *resh* inverted, and the points converging anteriorly upon the medial line." The usual W-shaped mark is present on the fore wings. In the male the supra-anal plate ends in three points as in *auletes*, but the central one is not as long and prominent as in that species. The uncus when viewed in profile is broadened and rounded at the extremity, and when viewed at full face the end is shallowly notched, but not as deeply as in *auletes*.

Haldeman gives "length of the body fourteen, to the end of the upper wings twenty-two lines, width of the prothorax seven lines." Most of the specimens in the author's collection are a trifle over these measurements, but they are from further south than the type locality.

Marksville, Avoyelles Co., La., Sept. 15, 1912, 1 male and 1 female.

Houma, Terre Bonne Co., La., July, 1914, 2 males and 4 females (E. C. Wurzlów).

Port Hudson, Miss, male, collection Mus. Comp. Zoology.

Elgin, Comanche Co., Oklahoma, July, 1914, 1 male and 1 female (Alanson Skinner).

Washunga, Kay Co., Oklahoma, July, 1914, 1 female (Alanson Skinner).

Orange, Orange Co., Texas, July, 1914, 5 males, 8 females; August, 3 males, 4 females; September, 21 males and 26 females (Miss McGill).

Cicada sonora Walker.

This species was described without locality by Francis Walker in 1850 in "List of the Specimens of Homopterous Insects in the Collection of the British Museum, Part 1, London, 1850." The wings are said to expand 60 lines, which makes it too large for anything but *auletes*. The markings as described do not agree, however, with those of that species.

Cicada resonans Walker.

This species was described in the same publication with *Cicada sonora*, and as with that insect no locality was given. Walker says in part: Body tawny with ferruginous tinge; head with a broad black band; face partly black; "scutcheon" of the fore-chest adorned with a very large obconical black stripe; borders mostly black; hind-scutcheon much widened and slightly waved on each side; middle-chest adorned with six black stripes, the second pair broader than the outer pair, narrower than the inner pair which are obconical; a large slightly cross-shaped black spot rests on the cross-ridge. Abdomen black above; legs tawny; fore thighs armed with three teeth of various size. Wings colorless; veins tawny; first and second cross-veins clouded with brown; primitive areolet faun-color; fore-flaps and the base of the hind-flaps gray with a buff tinge. Length of the body 18 lines; of the wings [expanse] 56 lines.

If the locality had been given as southeastern North America there would be little or no doubt as to which insect was described.

What he says about the fore femora being armed with three teeth of various sizes is of no importance, for some individuals of this species have three teeth, while others have but two.

The insect under consideration has often been identified as *Cicada bicosta* Walker, which was also described without locality. Distant, however, says this occurs in Mexico and Costa Rica, and in *Biologia Centrali-Americana* gives a figure of the insect on Tab. 3. This shows a smaller species than the one under consideration, with the hind borders of the abdominal segments ferruginous. Walker's original description of *Cicada bicosta* gives the length of body as 16 lines, and an expanse of wings of 48 lines, measurements too small for *resonans*. He also says that the hind borders of the abdominal segments are ferruginous, "middle-chest adorned with four black obconical stripes," instead of six as in *resonans*, and the "hind flaps" of the wings "at the base and fore-flaps brown," instead of "gray with a buff tinge."

I may add to the description of what I take to be *resonans*, that in the male the supra-anal plate is broad and ends in three points, as in *auletes* and *resh*; the uncus when viewed in profile is broad at the tip and shaped somewhat like a horse's hoof; when viewed from the back or at full face, the extremity is broad and truncated and not notched. In some specimens it is very slightly sinuated.

In the author's collection there are twenty specimens that are covered very well both as to size and markings by Walker's description of *resonans*, and they can bear that name until a better one is found.

Southern Pines, N. C., 3 males, 6 females; July, August and September (A. H. Manee).

Spring Creek, Decatur Co., Ga., July 23, 1911, female (J. C. Bradley).

Ormond, Volusia Co., Fla., 2 females (Mrs. Annie T. Slosson).

La Grange, Brevard Co., Fla., 2 males, 6 females, July, August, September and October (Davis and Chaudoin).

Gulf Port, Hillsboro Co., Fla., 2 males (A. G. Reynolds).

Mobile, Alabama, 1 female (H. P. Loding).

In the collection of the Museum of Comparative Zoology there is a female from Port Royal, S. C. (Fowler), and a female, here referred to this species, from Kansas.

***Fidicina literata* Walker.**

This species was also described by Walker in 1850 in "List of the Specimens of Homopterous Insects in the Collection of the British Museum, Part 1," and as with *resonans* no locality is mentioned. From size and description especially of the mesonotum it may be the same as *Cicada auletes*. The length of the body is given as 20 lines and the expanse of wings as 59 lines, which are a little large for *auletes*.

***Fidicina figurata* Walker.**

This was described in 1858 in "List of the Specimens of Homopterous Insects in the collection of the British Museum, Supplement"; and as with several of the species already mentioned no locality is given. If it is North American it is probably either *Cicada lyricen* De Geer (1773) or *Cicada similis* Smith and Grossbeck (1907). Walker says: "Prothorax reddish, black in front and behind, with a double tawny stripe, border tawny, with a black streak on each side. . . . Fore wings narrow, much acuminate. . . . Length of the body 17 lines; of the wings 44 lines." We understand that the wings expand 44 lines.

The fore wings are acuminate in both *lyricen* and *similis*, particularly so in the latter; they both have the hind border of the prothorax black, and the size is right for either. The hind margin of the prothorax is green or olive in *auletes*, *marginata* and *resh* and the wings in these three species are not much acuminate, and *figurata* is also too small an insect to be considered the same as *grossa* or *auletes*.

Leaving the cicadas that have been more or less associated in the past with *Cicada auletes* or *grossa* we come to the consideration of *Cicada pruinosa* and its varieties.

***Cicada pruinosa* var. *latifasciata* new variety.**

In their "Studies in Certain Cicada Species," Entomological News, April, 1907, Smith and Grossbeck drew up a description of *C. pruinosa* from the eight specimens from the coast of New Jersey in their possession, and in describing *C. winnemanna*, Bulletin of the Brooklyn Entomological Society, October, 1912, the writer followed their lead in considering these specimens typical of Say's species. However, in the last few years we have, through the kindness of

friends, accumulated a collection of about one hundred specimens of this species from Wells County, Indiana (E. B. Williamson), Hollister, Missouri (H. H. Knight), Falls City, Nebraska (H. G. Barber), Wakefield, Kansas (J. C. Warren), McPherson, Kansas (Warren Knaus), and Chetopa, Kansas (D. R. Beardslee). We have also examined many more in other collections including several from Texas. From this evidence it appears that the coast specimens, which have the stripe on the third abdominal segment comparatively broad, constitute a variety and cannot be considered typical with those from the interior of the country which have the stripe more attenuated or sometimes wanting. Of the variety we have collected about twenty in Cape May County, New Jersey; Mr. Francis Harper has sent us seventeen from the neighborhood of Beaufort, N. C., and a number of others have been examined in collections, from along the coast of New Jersey, and North Carolina, and two examples marked "Pennsylvania" are in the collection of the Academy of Natural Sciences of Philadelphia. In the collection of Mr. Otto Hiedemann there is a male of this variety from Victoria a town near the coast of Texas, and in the Uhler collection, U. S. Nat. Museum, there is a specimen collected by Belfrage in Texas.

Say says of *Cicada pruinosa*: "Found on the Missouri; it is also very common in Pennsylvania, and much resembles *C. tibicen* Fabr., but differs in being pruinose beneath, and in having white abdominal spots." Probably true *pruinosa* as well as the variety occurs in Pennsylvania, the latter being confined to the coastal region.

Cicada pruinosa was originally described in part as having the "tergum black: segments destitute of differently colored posterior margins, basal segment with a white pruinose spot each side of the back, another transversely elongated and attenuated one on the lateral base of the third segment, and another upon the lateral base of the caudal segment: venter dusky in the middle: caudal segments beneath testaceous, dusky near the middle tip."

Smith and Grossbeck say of the specimens they had from the coast of New Jersey and which we now know to be a variety: "Abdomen above black, base of first segment with a white, heavily pruinose lateral dash, which encroaches to some extent upon the second segment; a similar but longer and broader lateral dash extends along the base of the third segment and a spot of the same color is

on each side of the eighth segment. In the female the dash of the second segment differs from that of the male in not becoming attenuated dorsally, but in being squarely truncated."

For the variety thus described with the broad white lateral dashes on segment three, we propose the name of *latifasciata*. We then have *Cicada pruinosa* as described by Say, with the tergum entirely black or nearly so, with the attenuated white stripe at the lateral base of the third abdominal segment, being the form common from Indiana, Missouri, Nebraska, Kansas, etc., of which we figure a male from Chetopa, Kansas; *Cicada pruinosa* var. *latifasciata* so far known only from the coastal region of the eastern and southern United States, with the broad stripe on segment three and abdomen beneath more shining black, of which we figure a male from Cape May Co., New Jersey, and *Cicada pruinosa* var. *winnemanna* with the hind margins of the abdominal segments more or less fulvous, the second segment having the band broader than the others and a white streak generally hardly discernible each side at the base of the third segment, of which we figure a male from Plummer's Island, Maryland. The females of these cicadas have the characteristic markings far less distinct than in the males and occasionally some are entirely absent.

Cicada pruinosa and its varieties approaches *C. linnei* Smith and Grossbeck in appearance more closely than any other of our species, but in *linnei* the fore-wings are abruptly bent near the middle, whereas in *pruinosa* the curve is more regular. The genitalia are about the same in both species. Their songs are not at all similar.

Seen in series *pruinosa* from Kansas has the costal margin of the fore wings evenly curved, whereas specimens from Indiana and especially var. *winnemanna* show a decided tendency to a sudden bend near the central portion of the costal margin.

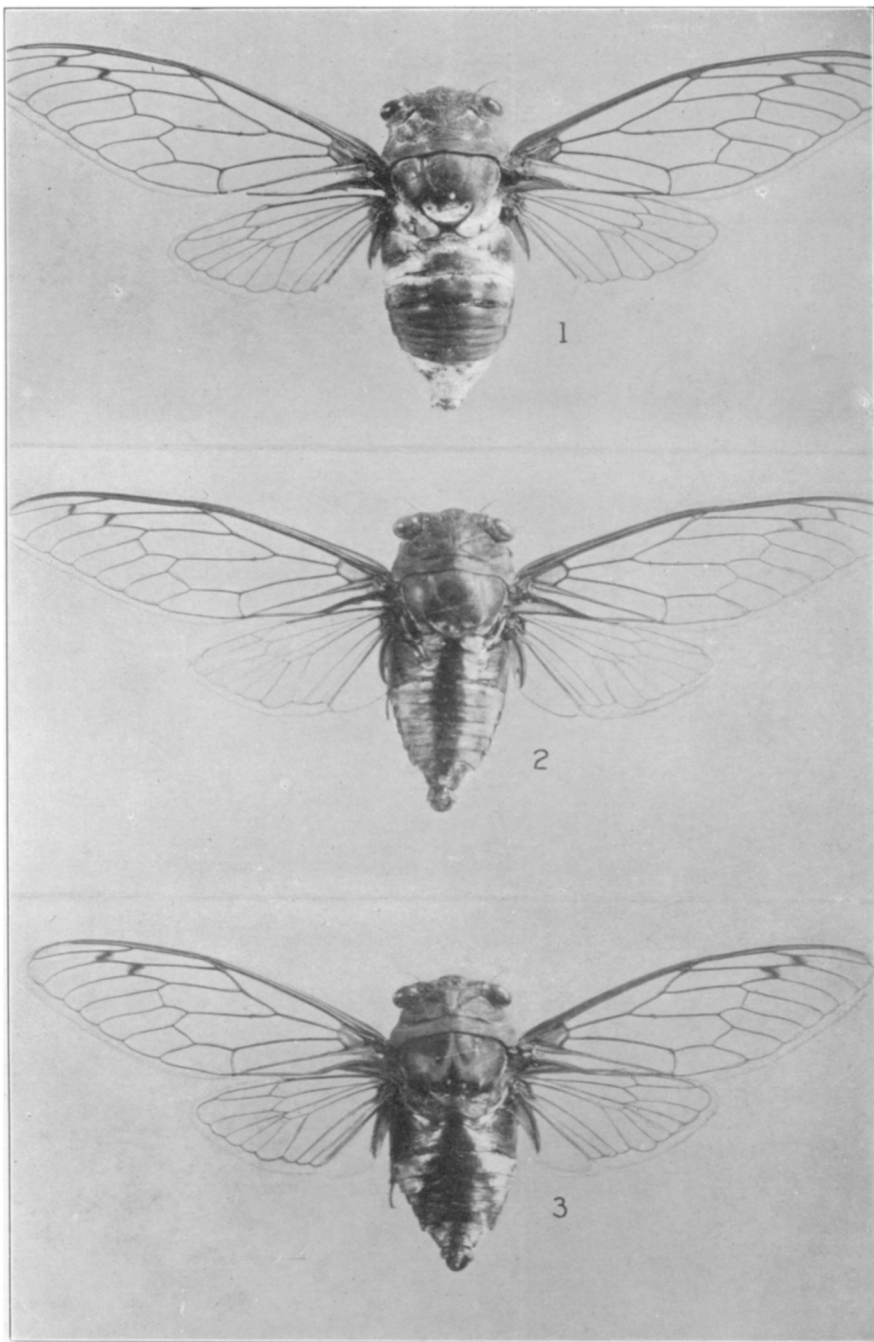
EXPLANATION OF PLATES.

PLATE 1.

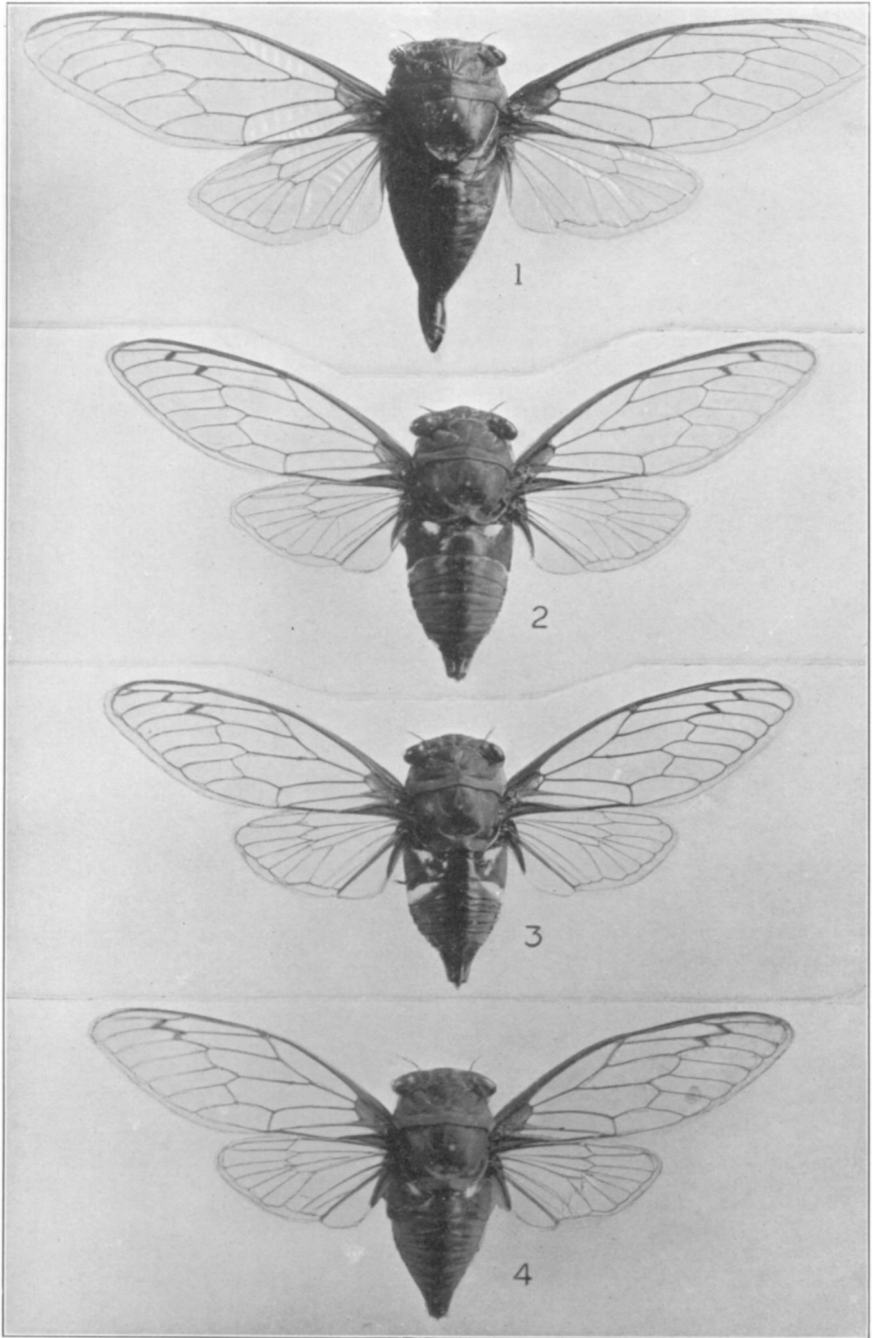
- Fig. 1. *Cicada auletes* Germar.
- Fig. 2. *Cicada resonans* Walker.
- Fig. 3. *Cicada resh* Haldeman.

PLATE 2.

- Fig. 1. *Cicada marginata* Say.
- Fig. 2. *Cicada pruinosa* Say.
- Fig. 3. *Cicada pruinosa* var. *latifasciata* Davis.
- Fig. 4. *Cicada pruinosa* var. *winnemanna* Davis.



Cicadidæ.



Cicadidæ.